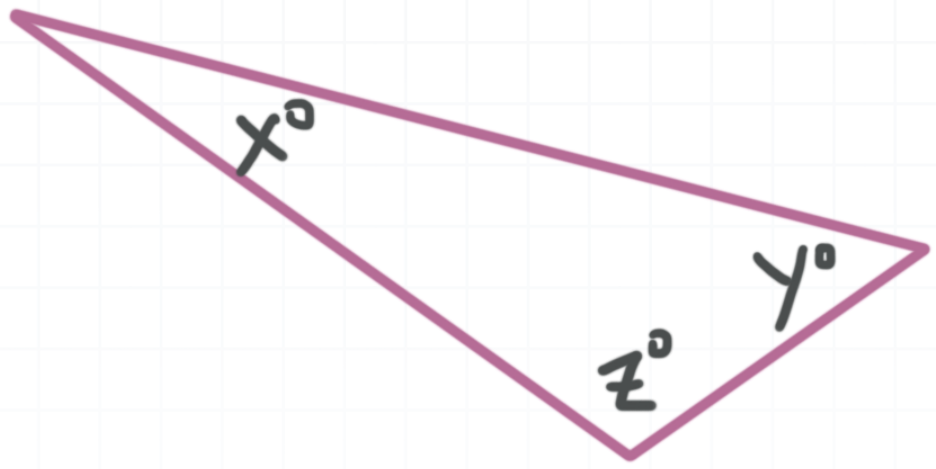
Interior angles of triangles

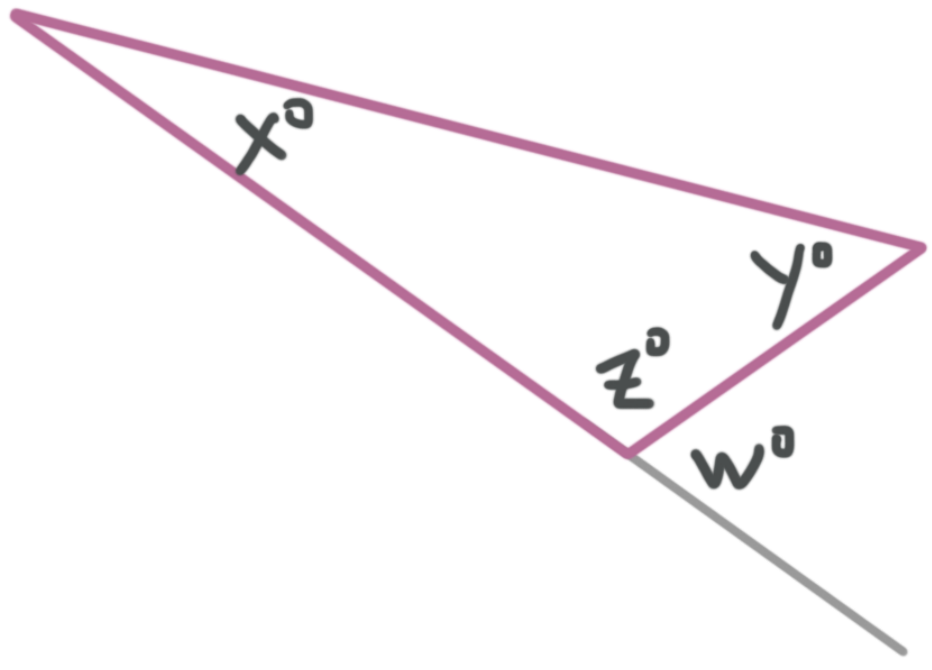
The interior angles of a triangle are the three angles on the inside of a triangle. These three angles always sum to 180°.



$$x^\circ + y^\circ + z^\circ = 180^\circ$$

There are a few other angle relationships we need to remember:

The angle measures that form a straight line add to 180°, so $z^\circ + w^\circ = 180^\circ$.



Vertical angles are congruent, so $x^\circ = y^\circ$.

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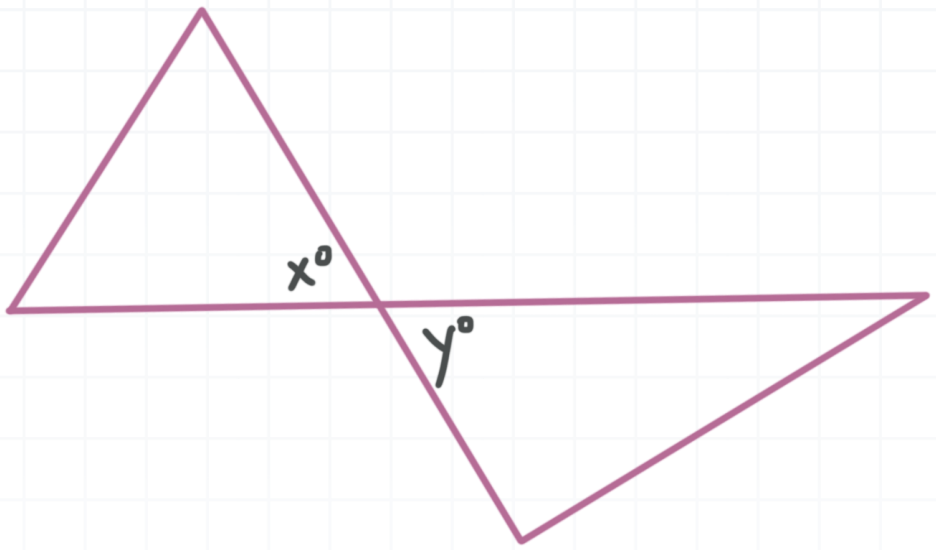
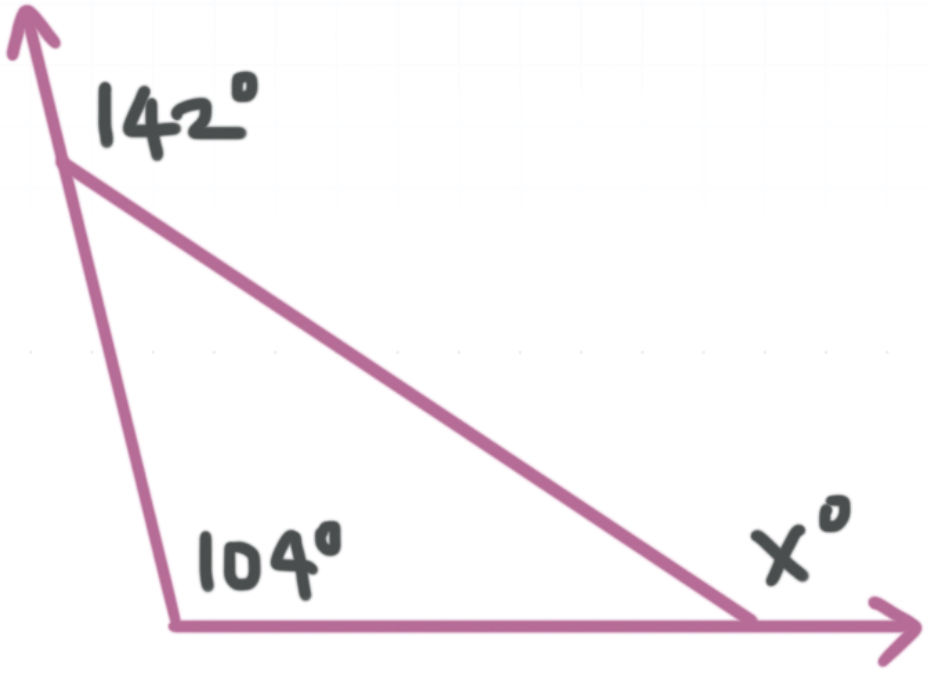


Let's start by working through an example.

Example

What is the value of x?



We know that these two angles lie on a straight line:

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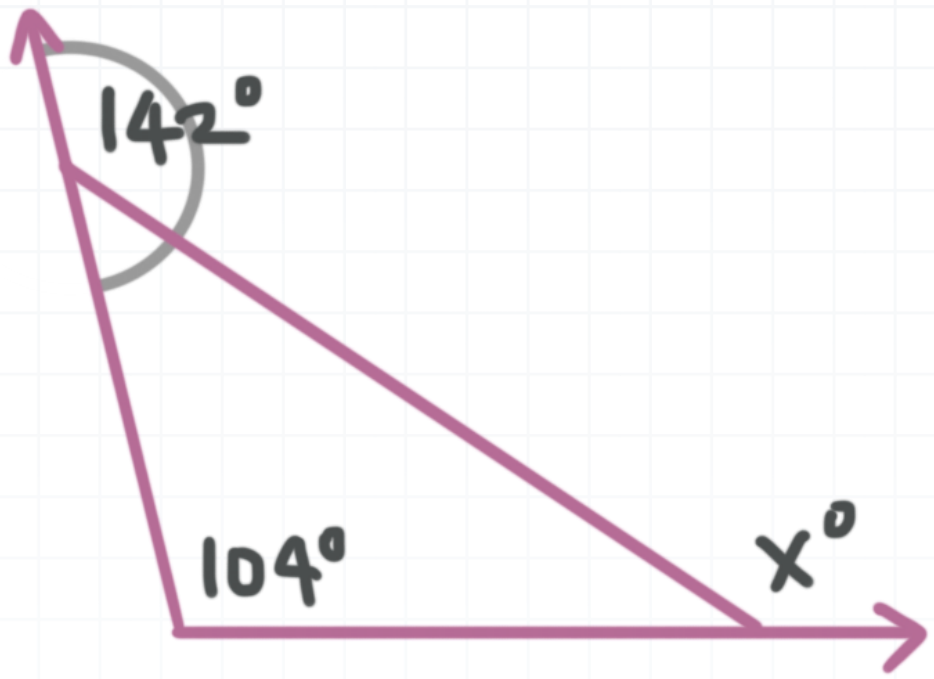
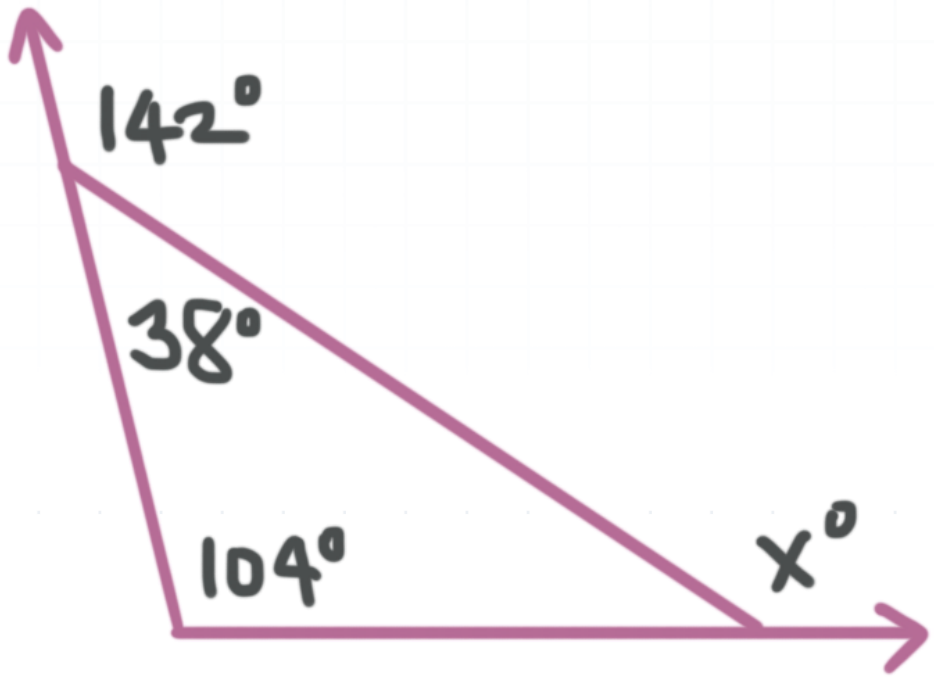


We can find the measure of the angle by subtracting $180° - 142° = 38°$.



The three angles inside a triangle sum to $180°$, so

$$180° - 104° - 38° = 38°$$

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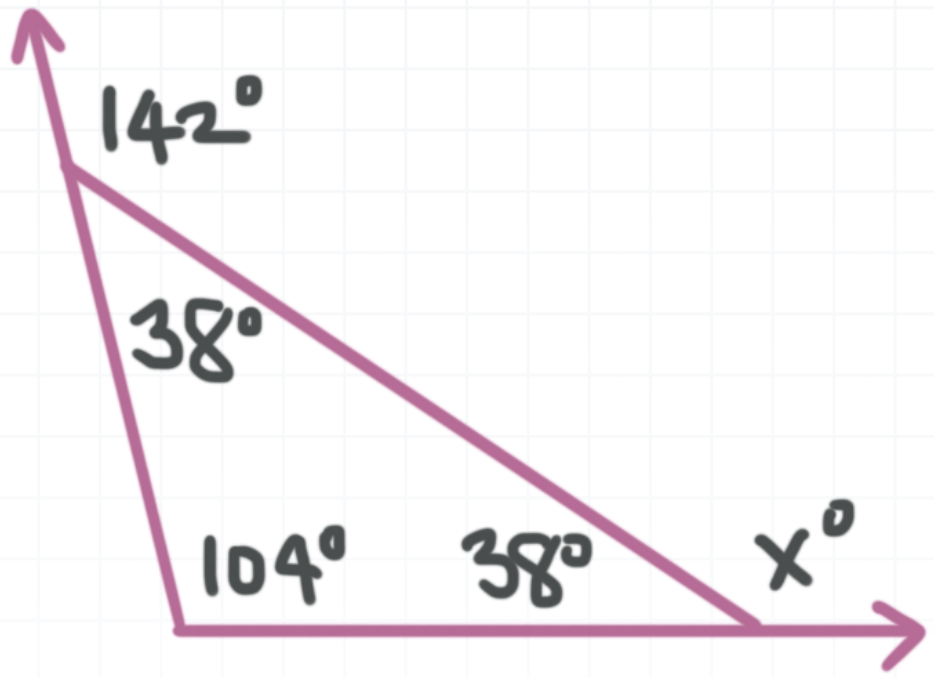

Now we can see that $x°$ and $38°$ lie on a straight line, so

$$x° + 38° = 180°$$

$$x° = 142°$$

Let's try another one.

Example

What is the value of y?

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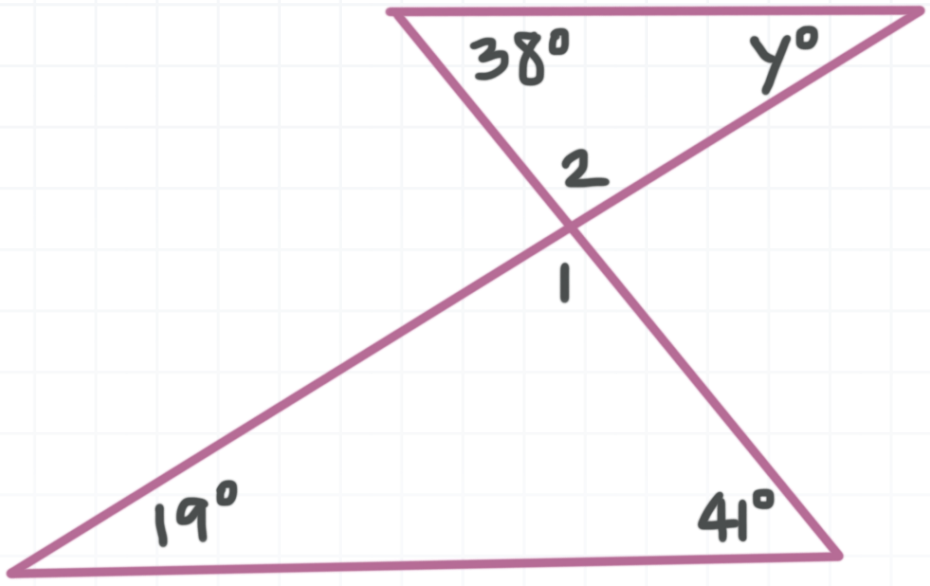

The three interior angles of a triangle sum to $180°$, so

$$m\angle 1 + 19° + 41° = 180°$$

$$m\angle 1 = 120°$$

Vertical angles are congruent, so

$$m\angle 1 = m\angle 2 = 120°$$

Again, the three angles of a triangle sum to $180°$, so we can say

$$m\angle 2 + 38° + y° = 180°$$

$$120° + 38° + y° = 180°$$

$$y° = 22°$$

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